1)

Find all eigenvalues and normalized eigenvectors of

Thus we have the pairs:

2)

See attached.

The result of the Power Method gives

3)

See Attached

Rayleigh Quotient gives an eigenvalue of

4)

See Attached

Inverse power method gives

Rayleigh Quotient gives

5)

If there is a multiplicity in eigen value, there could be some mashing up of eigenvectors making it impossible to find the eigenvectors through the Power Method

6)

7)

8)

Optional

The position and momentum operators do no commute (), or, they do not share an eigenbasis; a measurement of one observable does not give any information on the other, and the information gained is destroyed by a measurement of the other observable. This is manifest, e.g., in the canonical uncertainty principle: where .